BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 5 NOVEMBER 1960 PART 15

INSTITUTE NEWS

West of England Autumn Meeting

The Fifty-second Autumn Meeting of the Institute was held in Bath on 5–9 September. The meeting was attended in all by some 350 persons, including a number from overseas.

The meeting began on the afternoon of Monday, 5 September, in the Pump Room, where members and their guests were welcomed by the Mayor of Bath (Councillor Arthur Knight) and by the Chairman of the Reception Committee (Mr. D. M. G. Sneddon). The President (Sir Ronald Prain) replied.

After an interval for tea, the meeting was resumed with two simultaneous technical sessions dealing with " Engineering Properties of Nickel-Base Alloys " and " Lubricants for Cold Rolling Aluminium ". At 6.30 members were entertained at a cocktail party in the Pump Room.

A discussion on " Recovery and Recrystallization ", organized by the Metal Physics Committee, took place on the morning of Tuesday, 6 September, with an alternative session on " Engineering Properties of Alloys ".

In the evening the Mayor of Bath gave a civic reception and dance at the Pump Room.

Further technical sessions were held on the morning of Thursday, 8 September, when there were side-by-side discussions on " The Relative Merits of Extrusion and Other Methods for the Manufacture of Bar, Rod, and Wire-Rod ", arranged by the Metallurgical Engineering Committee, and " Magnesium Alloys for Fuel-Element Components ", arranged by the Nuclear Energy Committee.

On Tuesday afternoon, Wednesday, and Thursday afternoon, visits were paid to a number of works; visits and excursions were also arranged for ladies taking part in the meeting.

All members and guests were entertained to dinner by the Reception Committee during the meeting. As the Banqueting Room in the Guildhall, Bath, could not accommodate everyone at the same time, half of those attending the meeting were invited on the evening of Wednesday, 9 September, and the remainder on the following evening. On the first occasion the principal guests were the Mayor and Mayoress of Bath and on the second occasion the Lord Mayor of Bristol (Alderman A. Hugh Jenkins) and the Lady Mayoress.

The meeting concluded after the Autumn Lecture on " Metals and the World of Engineering Structures " had been delivered by Professor Sir Alfred Pugsley, on the morning of

The Mayor of Bath (Councillor Arthur Knight) welcoming members and guests to the City.

Left to right: Mr. B. Walters (Secretary, Reception Committee), Mr. R. H. Cobb (President, Bath Chamber of Commerce), the Mayor, Mr. D. M. G. Sneddon (Chairman, Reception Committee), and the President of the Institute of Metals (Sir Ronald Prain).

Right to left: The Mayor of Bath (Councillor Arthur Knight), the Chairman of the Reception Committee (Mr. D. M. G. Sneddon), Mrs. Sneddon, and the Mayoress at the banquet on 7 September.

Friday, 9 September. The lecture is printed in this issue of the *Journal* (p. 81). A vote of thanks to all those responsible for the success of the meeting was proposed by Mr. E. A. G. Liddiard and seconded by Dr. J. C. Chaston.

Informal Discussion on " Segregation to Grain Boundaries "

The Metal Physics Committee is proposing to arrange an informal one-day discussion with this title in conjunction with the Spring Meeting in 1961. For the purpose of the discussion segregation is defined as local increase in the concentration of any constituent of the material. The object is to seek more understanding than exists at present on the quantity and nature of the segregates that may occur at grain boundaries, the processes that lead to their formation, and the effects they exert on the mechanical and physical properties of the material. Grain-boundary segregates formed during casting are included.

The following subjects fall within the scope of the conference:

1. The detection and measurement of grain-boundary segregation, e.g., by tracer analysis, autoradiography, emission analysis and electron microscope and field microscope examination, measurement of grain-boundary energy, internal friction and melting point.

2. The effects of grain-boundary segregation on mechanical properties, corrosion and stress corrosion, migration of grain boundaries, and the low-temperature conductivity minimum.

3. Theory of the formation and dispersion of grain-boundary segregates.

It will help the Committee if those who are able to contribute will forward to the Committee a brief note indicating the scope of their contribution by 31 December 1960. No publication of the discussion by the Institute is proposed.

International Conference on " The Metallurgy of Beryllium "

The Institute of Metals is holding a three-day International Conference on " The Metallurgy of Beryllium " in London on 16, 17, and 18 October 1961. The intention is to publish and discuss a great mass of hitherto unpublished original work on beryllium and to cover metal fabrication, physical and mechanical properties, and metal physics—in fact the whole field of the metallurgy of beryllium with the exception of extraction processes. The Conference will be organized by the Institute's Nuclear Energy Committee.

The Organizing Committee invites offers of original papers for this important Conference and requests that prospective authors shall submit firm titles and synopses of their papers by 1 January 1961 and the final manuscripts, in duplicate, not later than 1 April 1961. Prospective authors are asked to advise the Secretary, as soon as possible, of the topics on which they intend to offer papers.

Papers will be issued in preprint form in advance of the Conference and will later be published promptly, together with reports of the discussions, in bound form.

Correspondence regarding the Conference should be addressed to the Secretary, The Institute of Metals, 17 Belgrave Square, London, S.W.1.

Election of Members

The following 30 Ordinary Members, 6 Junior Members, and 6 Student Members were elected on 28 September 1960:

As Ordinary Members

ALLEN, Norman, A.I.M., Chief Metallurgist, Wickman Machine Tool Manufacturing Co., Ltd., Coventry.

BHARGARA, Ram Dev, D.Sc., Works Manager, Mahindra Sintered Products, Ltd., Bombay, India.

BERRY, Robert, L.I.M., Metallurgist, Standard-Triumph Group Services, Ltd., Engineering Development Laboratory, Coventry.

BOCK, Keith R., M.S., Metallographer, Metallurgical and Quality Control Department, In plant Z40, Kaiser Steel Corp., Fontana, Calif., U.S.A.

BOULTON, Henry Augustine Barrett, A.I.M., Chief Metallurgist, Royal Ordnance Factory, Ministry of Aviation, Cardiff.

BRAITHWAITE, Eric Reeves, M.Sc., Ph.D., F.R.I.C., Research and Development Manager, Acheson Colloids, Ltd.

BRENNON, Bruce E., Director, Technical Information, Product Development Division, Reynolds Metal Co., Richmond, Va., U.S.A.

CARAPELLA, Sam Charles, Jr., M.S., Ph.D., Superintendent, Pure Metals Development, Central Research Laboratories, American Smelting and Refining Co., South Plainfield, N.J., U.S.A.

CASPERSSON, Stig C. O., General Production Manager, A. B. Bofors, Bofors, Sweden.

CHRISTIANSEN, Herluf, Engineer in charge of Extrusion Plant, Aktieselskabet Nordiske Kabel- og Traadfabriker, Copenhagen, Denmark.

DAVIES, Raymond, General Manager, Bessbrook Products, Ltd., Newry, Co. Down, N. Ireland.

ENDECOTT, Albert Ernest, Managing Director, Endecotts (Filters), Ltd., London.

GOULD, Robert, Assistant Mechanical Engineer, Alcan Industries, Ltd., Rogerstone, Mon.

HARTREE, John Richard, B.A., Metallurgist, Alcan Industries, Ltd., Banbury.

HOFMANN, Hans, Dr.sc.techn., Chef der Versuchsabteilung, Aluminium AG Menziken, Menziken, Switzerland.

JOHNSON, Kenneth Vivian, Chief Designer, William Bleloch, Consulting Engineer, Johannesburg, Transvaal, South Africa.

JORDAN, David Robin, Assistant Metallurgist, Johnson, Matthey and Co., Ltd., London.

LESER, Hans-Georg, Dipl.-Ing., General Manager, EXATEST, Gesellschaft für Messtechnik m.b.H., Leverkusen, Germany.

MCBRIDE, (*Mrs.*) Harriet, Librarian, American Smelting and Refining Co., South Plainfield, N.J., U.S.A.

MACLEAN, Kenneth Alan, B.Sc., M.I.Mech.E., Head of Fabricating Technique Division, Aluminium Laboratories, Ltd., Banbury.

MADDIGAN, Stephen Edward, B.A., M.S., Ph.D., Assistant Director of Metallurgical Research, Kaiser Aluminum and Chemical Corp., Spokane, Wash., U.S.A.

MYLES, Dorothy Isabella Katherine, Technical Information Officer, The Mond Nickel Co., Ltd., London.

SCOTT, Margaret Joan, Librarian, Newcastle University College, Tighe's Hill, N.S.W., Australia.

STANNERS, John Francis, B.Sc., Head of Corrosion Research, British Iron and Steel Research Association, London.

STORER, Kenneth Roland, Foundry Technician, F. H. Lloyd and Co., Ltd., Wednesbury.

TOWNER, Raymond Jay, M.Met., Ph.D., Research Engineer, Alcoa Research Laboratories, Aluminum Company of America, New Kensington, Pa., U.S.A.

WALLWORK, Alfred Edwin, B.Sc., A.R.S.M., Technical Officer (Metallurgical), Research Laboratories, Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

WELSH, Henry Lloyd, B.Sc., General Manager, Copper and Alloys, Ltd., West Bromwich.

WILLEUMIER, Frederik Herman, Metallurgist, Internationale Bedrijfsmachine Maatschappij N.V., Amsterdam, Netherlands.

WOOLDRIDGE, Sidney George, Technical Sales Officer, High Duty Alloys, Ltd., Slough.

As Junior Members

ABSON, Jonathan David, B.A., Metallurgist, The British Aluminium Co., Ltd., Falkirk.

CURBISHLEY, George, L.I.M., Metallurgist, Oil Engine Division, Rolls Royce, Ltd., Shrewsbury.

PRAKASH, Bhanu, B.Sc., Lecturer in Metallurgy, Intensive Training Course, College of Mining and Metallurgy, Banaras Hindu University, Banaras, India.

PURI, B. R., B.Sc., D.I.I.Sc., Graduate Trainee, Rolling Mill Department, Durgapur Steel Plant, Durgapur, West Bengal, India.

RAO, B. V. Mohan, M.Eng., Graduate Engineer (Foundry), Durgapur Iron and Steel Works, Durgapur, West Bengal, India.

WYARD, Clifford James, Assistant Metallurgist, Manganese Bronze and Brass Co., Ltd., Ipswich.

As Student Members

BARDSLEY, John, Metallurgist, Atomic Weapons Research Establishment, U.K. Atomic Energy Authority, Aldermaston.

BELL, George Howard, M.S., Graduate Student, University of California, Berkeley, Calif., U.S.A.

CONNELL, Wilfred, Undergraduate, Department of Metallurgy, King's College, University of Durham, Newcastle-on-Tyne.

KEOWN, Samuel Robert, Metallurgical Assistant, Swinden Laboratories, United Steel Co., Ltd., Rotherham.

LARKOVIC, William Michael, B.S., Graduate Student, Department of Metallurgical Engineering, University of Oklahoma, Norman, Okla., U.S.A.

RAY, Stuart Howson, Student Metallurgist, Imperial Chemical Industries, Ltd., Metals Division, Birmingham.

PERSONAL NOTES

MR. J. F. BREEDIS has left Yale University and is now in the Department of Mining and Metallurgical Engineering, University of Illinois, Urbana, Ill.

MR. D. B. COLLINS has joined the staff of the Research and Development Laboratory, Midland Rollmakers, Ltd., Crewe.

MR. J. H. DICKIN has retired from his position as Manager of the Latchford Lock Works of the British Aluminium Co, Ltd., Warrington.

Dr. A. R. Entwisle is spending a year in the Department of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass. During this time he will be on leave of absence from the University of Sheffield.

Mr. J. D. Eyre has left Wilkinson Sword, Ltd., and is now at the Works Metallurgical Department of Stewarts and Lloyds, Ltd., Corby.

Mr. R. Hardy has left King's College, Newcastle-upon-Tyne, and is now an investigator at Aluminium Laboratories Limited, Banbury.

Mr. E. L. Harmon has left Union Carbide Metals Company and is now Senior Research Engineer, Materials Research Section, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, Calif.

Mr. R. Hazzard has left Atomic Power Constructions, Ltd., to become a development metallurgist with Rolls-Royce and Associates, Ltd., Derby.

Mr. E. D. Lloyd has left Manchester University and is now in the Physical Metallurgy Section of the Research Department at A.E.I. (Manchester), Ltd., Manchester.

Mr. G. G. McDonald has been appointed Acting Branch Superintendent of the Defence Standards Laboratories, Finsbury, S. Australia.

Mr. J. F. McNeil has been appointed Physical Sciences Representative, Department of Supply, Australia House, London, for a two-year period.

Mr. J. G. Marshall has left Henry Wiggin and Co., Ltd., to join Joseph Lucas, Ltd., Birmingham, as a metallurgist.

Mr. F. J. Rawbone has left Plastic and Metal Industries (Pty.), Ltd., Johannesburg, on his appointment as General Works Manager of Flexile Metal Co., Stevenage, Herts.

Dr. J. A. Roberts is now with Transition Electronic Corp., Wakefield, Mass.

Dr. D. W. Smith has been appointed Assistant to the Director, Applied Research Laboratory, United States Steel Corp., Monroeville, Pa. He was previously with Kaiser Aluminum and Chemical Corp., Spokane.

Mr. K. S. Sree Harsha has left the University of Notre Dame, where he obtained the M.S. degree in metallurgical engineering, and is now at the Pennsylvania State University, University Park, Pa.

Dr. P. W. Whitton is leaving Imperial Chemical Industries, Ltd., Metals Division, to take up an appointment as Professor of Mechanical Engineering and Head of the Department in the University College of the West Indies.

Dr. W. M. Williams has been appointed Assistant Professor in the Department of Metallurgical Engineering at McGill University, Montreal. He recently received the Ph.D. degree of Toronto University.

Deaths

The Editor regrets to announce the deaths of:

Professor Pierre Chevenard, Membre de l'Institut, Commandeur de la Légion d'Honneur, on 15 August 1960, aged 71. He had been an Honorary Member of the Institute since 1947 and was for many years Corresponding Member to the Council for France.

Mr. Walter Henry Antonio Robertson, Original Member and Fellow of the Institute, on 21 September 1960.

POWDER METALLURGY JOINT GROUP

1960 Winter Meeting, 15 and 16 December 1960

The next meeting of the Powder Metallurgy Joint Group will be held at Church House, Great Smith Street, London, S.W.1, on Thursday and Friday, 15 and 16 December 1960. The programme is detailed below.

Thursday, 15 December

Afternoon (2.30 to 5.0 p.m.)

Theme: " Sintered Stainless Steel ". A discussion of the following two papers, published in *Powder Metallurgy*, No. 5, 1960, pages 85–115:

" Sintered Stainless Steel. I.—The Influence of Alloy Composition upon Compacting and Sintering Behaviour ", by R. L. Sands and J. F. Watkinson.

" Sintered Stainless Steel. II.—The Properties of Stainless Steel Powders Sintered in Dissociated Ammonia ", by R. L. Sands and J. F. Watkinson.

Friday, 16 December

Symposium on " Practical Aspects of Pressing Metal Powders ", based on a series of papers previously printed in *Powder Metallurgy*. (The paper by Livey, Denton, Brett, and Williams was printed in No. 5, pages 130–48; all the other papers will be published in No. 6, due for despatch to subscribers in November.)

Morning Session (9.30 a.m. to 12.30 p.m.)

Presentation and discussion of the following papers:

1. " Some Developments in Metal Powder Presses ", by J. Oakley (Manganese Bronze and Brass Co., Ltd., Ipswich).
2. " The Influence of Tooling Methods on the Density Distribution in Complex Metal Powder Parts ", by H. G. Taylor (Höganäs-Billesholms A.B., Höganäs, Sweden).
3. " Some Fundamental Studies in the Cold Compaction of Plastically Deforming Solids ", by D. Train and J. A. Hersey (School of Pharmacy, University of London).
4. " Determination of Hoop Stresses Induced in a Cylindrical Steel Die by Compacting Metal Powders ", by S. J. Bustamante and H. Sheinberg (Los Alamos Scientific Laboratory, University of California, Los Alamos, N. Mex., U.S.A.).
5. " Radial Pressures in Powder Compaction ", by W. M. Long (Atomic Weapons Research Establishment, United Kingdom Atomic Energy Authority, Aldermaston).
6. " The Displacement of Gas from Powders during Compaction ", by W. M. Long and J. R. Alderton (Atomic Weapons Research Establishment, United Kingdom Atomic Energy Authority, Aldermaston).

Afternoon Session (2.0 to 5.0 p.m.)

Presentation and discussion of the following papers:

7. " The Compacting of Metal Powders by Explosives ", by W. T. Montgomery and H. Thomas (Imperial Chemical Industries, Ltd., Nobel Division, Stevenston).
8. " Aspects of the Volume Production of Green Porous Bearing Compacts ", by M. A. Pound, A. E. S. Rowley, and J. E. Elliott (Bound Brook Bearings, Ltd., Lichfield).

9. "The Processing of Enriched Uranium Oxide-Paraffin Wax Mixtures," by L. D. Huckstepp and G. V. Day (Atomic Weapons Research Establishment, United Kingdom Atomic Energy Authority, Aldermaston).
10. "The Compacting of Graphite and Graphite/Uranium/Thorium Mixtures", by D. T. Livey, I. Denton, N. Brett, and J. Williams (Atomic Energy Research Establishment, United Kingdom Atomic Energy Authority, Harwell).
11. "The Isostatic Pressing, Vacuum Sintering, and Swaging of Thorium Powder", by H. Lloyd and A. E. Symonds (Atomic Energy Research Establishment, United Kingdom Atomic Energy Authority, Harwell).
12. "The Production of Hollow Shapes in Beryllium Powders by Various Techniques", by G. C. Ellis (Atomic Weapons Research Establishment, United Kingdom Atomic Energy Authority, Aldermaston).
13. "Hot Pressing of Ceramic Powders", by A. G. Thomas and H. J. Jones (The Plessey Co., Ltd., Towcester).

1961 Spring Meeting

The Spring Meeting of the Group will be held at the Royal Commonwealth Society, Northumberland Avenue, London, W.C.2, on Monday and Tuesday, 17 and 18 April 1961, when there will be a discussion on "The Appraisal of Powders for Pressing and Sintering". The afternoon of Monday, 17 April, will be devoted to a discussion of three specially invited review papers dealing with "Techniques for the Evaluation of Powders". The whole of Tuesday, 18 April, will be occupied with a discussion on "The Relationship between Properties of Powders and Their Pressing and Sintering Behaviour".

1961 Winter Meeting

The principal theme for discussion will be "Sintered Materials for High-Temperature Service".

Offers of papers describing original, unpublished work for this meeting are invited.

1962 Spring Meeting

The principal subject for discussion will be "Disperse-Phase-Hardened Systems".

Offers of papers describing original, unpublished work are invited.

"Powder Metallurgy"

Powder Metallurgy—the official organ of the Powder Metallurgy Joint Group—is published half-yearly, in March and November.

The annual subscription rates (including postage) are: Members of The Iron and Steel Institute and of The Institute of Metals (one annual subscription each at the privileged rate): 10*s* or $1.85. Non-members: 25*s*. or $3.80.

OTHER NEWS

Deutsche Gesellschaft für Metallkunde

The next annual meeting of the Deutsche Gesellschaft für Metallkunde will be held in Hamburg on 1–5 June 1961.

Sixth International Conference on Hot-Dip Galvanizing

The sixth in the series of International Conferences on Hot-Dip Galvanizing is to be held in Switzerland—at the Kursaal, Interlaken—on 4–9 June 1961, and not in France as previously announced.

Three days will be devoted to technical sessions, at which over 20 papers will be presented on works practice, the properties and corrosion-resistance of galvanized coatings, the welding of galvanized steel, the metallurgy of galvanizing, after-treatments, and the heating of galvanizing baths. One session will also be devoted to sheet galvanizing. Preprints of the papers will be issued in French, German, Italian, and English, and there will be simultaneous translation into the same four languages at the technical sessions themselves. The edited proceedings of the Conference, to be published towards the end of 1961, will be issued free to all delegates.

Works visits will be arranged in conjunction with the Conference to general galvanizing plants in Switzerland and to sheet, wire, and tube galvanizing plants in Italy. Plant, equipment, and materials supplied to the galvanizing industry will be exhibited by manufacturers in a room adjacent to the conference hall.

Those wishing to attend the Conference as delegates or to participate in the exhibition of plant, equipment, and materials should write to the Zinc Development Association, 34 Berkeley Square, London, W.1.

First International Congress on Metallic Corrosion

The first International Congress on Metallic Corrosion will be held in London on 10–15 April 1961.

The Congress will be opened on Monday afternoon, 10 April, by the President, Sir Harry Melville, and will be followed by the first scientific session for the presentation and discussion of papers. The following four days (Tuesday 11 April to Friday 14 April) will each start with a plenary lecture to be given respectively by the following eminent authorities in the field of metallic corrosion: Professor Y. M. Kolotyrkin (U.S.S.R.), Professor P. Lacombe (France), Professor H. H. Uhlig (U.S.A.), and Dr. U. R. Evans (U.K.).

Scientific sessions will follow the plenary lectures until lunch time on each day and will also be held on Wednesday and Friday afternoons. On Tuesday and Thursday afternoons, instead of scientific sessions, a variety of visits to laboratories and industrial organizations is being arranged.

There will be a total of rather less than 100 papers, all of a very high standard, emanating from eighteen countries, including many by the most outstanding workers in the field of corrosion science. The papers will be grouped under the following headings: high-temperature oxidation; atmospheric corrosion; underground corrosion; inhibitors; electrochemical, thermodynamic, and kinetic studies; laboratory corrosion testing and experimental methods; protection by metal coatings; protection by non-metallic coatings or by chemical treatment; cathodic and electrolytic protection; stress and intergranular corrosion; corrosion fatigue; corrosion in boilers and heat exchangers; corrosion in the atomic-energy field; industrial and service experience.

In collaboration with the organizers of the Congress the Science Museum (which is close to the lecture theatres) is arranging a Corrosion Exhibition, mainly of historic interest, which should prove specially attractive to delegates from over-

seas. Social events arranged for the evenings will include a Government reception, other receptions, and a banquet. An attractive programme for the ladies is being arranged by a Ladies' Committee under the Chairmanship of Lady Melville.

Corrosion and Metal Finishing Exhibition

The Corrosion and Metal Finishing Exhibition, organized by *Corrosion Technology*, will be held at Olympia, London, W., on 29 November–2 December 1960.

In connection with the exhibition, symposia have been arranged by the Plastics Institute and the Corrosion Group of the Society of Chemical Industry, and these will occupy the Empire Restaurant on the afternoons of Tuesday, November 29, and Thursday, December 1, respectively. Papers to be read and discussed at the Plastics Institute Symposium are: "Protective Packaging—Engineering Applications" (G. Gonda), "Plastics as Heavy Protective Coatings" (N. Vinson), and "Fabricated Plastics and Their Role in Combating Corrosion" (K. V. Pepper). Subjects at the Corrosion Group Symposium will be: "Influence of Water Movement on Corrosion: Ferrous Materials" (Dr. G. Butler, National Chemical Laboratory) and "Influence of Water Movement on Corrosion: Non-Ferrous Metals" (Dr. N. V. Nowlan, Admiralty Materials Laboratory). The symposia are open to visitors. Film shows will be held on three of the four days.

Members of the Institute may obtain free tickets for the exhibition on application to the Organizers, 9 Eden Street, London, N.W.1.

Symposium on "Light Metal Industry in India"

A Symposium on "Light Metal Industry in India" will be held early in February 1961 at the National Metallurgical Laboratory, Jamshedpur.

The scope of the Symposium will broadly cover the following:

1. Indigenous raw materials for the light metal industry, their assessment, preparation and beneficiation, &c.
2. Pyro-, electro-, and hydro-metallurgical techniques of production of light metals and their alloys in the general context of indigenous raw materials and resources.
3. Physico-chemical reactions governing the extraction metallurgy of light metals and alloys based on theoretical, thermodynamic, and thermal-efficiency considerations.
4. Recent technological advances in metal casting, including continuous-casting techniques, special metal-working processes, including cladding, extrusion, deep drawing, pressing, wire drawing, &c.
5. Reclamation and refining of light alloy scrap and development of indigenous secondary alloy industry.
6. Recent developments in heat-treatment of light metals and alloys, including specialized equipment, &c.
7. Physical, chemical, and corrosion-resisting properties of light metals and their alloys at room and elevated temperatures.
8. Physical metallurgy of light metals and their alloys.
9. The role of light metals and alloys in metallurgical and chemical engineering and nuclear-reactor technology.
10. Present status and future expansion of light metal industry in India in relation to Five-Year Plans and world production trends.

Invitations are being extended to technologists, metallurgists, and research scientists in India and abroad to attend the Symposium and contribute technical papers for discussion. The Symposium will provide an international forum for establishing personal contacts and facilitating exchange of ideas on the development of light alloy industry in general and that of India in particular.

Further information may be obtained from the Director, National Metallurgical Laboratory, Jamshedpur-7, India.

Symposium on "Electrical Contacts"

The Institute of Physics and The Physical Society announces that it is arranging, in collaboration with The Institution of Electrical Engineers, a Symposium on "Electrical Contacts", which will take place in Brunel College of Technology, London, on 5–7 April 1961.

The Symposium is intended to cover recent advances in the study of the phenomena occurring at mating surfaces carrying currents used in light electrical engineering. It will include electrical erosion and material transfer, mechanical wear, and the influence of surface films and contamination and will deal with make-and-break contacts, sliding contacts, semi-permanent contacts and connections, between metallic and non-metallic materials. In view of the nature of current developments, it is considered that major interest will be focused on aspects relating to contact resistance. A number of short papers have already been invited by the organizing Committee, which will be glad to consider offers of other contributions.

The Symposium is intended mainly for persons concerned with the design and improvement of contacts. There will be a small informal exhibition which will be open during the Symposium to those attending the meetings. Abstracts (but not preprints) will be circulated before the Symposium, the proceedings of which will not be published in full.

All communications regarding the Symposium should be sent to the Secretary, The Institute of Physics and The Physical Society, 47 Belgrave Square, London, S.W.1.

Nuclear Metallurgy in Argentina

New laboratories for research in nuclear metallurgy were opened on 27 July in Buenos Aires by the Argentine Atomic Energy Commission.

The Metallurgy Division, the Head of which is Dr. J. A. Sabato, is organized in seven groups: foundry and heat-treatment, fuel element design, physical metallurgy, metallography, powder metallurgy, radiometallurgy, and deformation of metals.

The new laboratories are well equipped with up-to-date furnaces and testing machines, and with rolling mills and presses.

Subjects at present under investigation include: production of fuel elements for a new reactor, development of a prototype MTR fuel element, development of a sintered UO_2 fuel element, production of α-uranium single crystals, resistance of aluminium alloy to corrosion by high-temperature water, U_3O_8–UO_2 equilibrium in the range 1000–1500° C, plastic deformation of σ-phase single crystals, solidification of high-purity aluminium, influence of gases on the properties of uranium, and solid-state transformations in β-bronzes.

DIARY

The Institute

8 December. "Some Design Aspects of the Gas-Cooled Nuclear Power Stations", by R. E. Bucknell. (Joint meeting with the Society of Chemical Industry and the Royal Institute of Chemistry). (Chemical Department, The University, Woodland Road, Bristol 8, at 6.30 p.m.)

Powder Metallurgy Joint Group

15 December. Discussion of two papers, published in *Powder Metallurgy*, 1960, No. 5: "Sintered Stainless Steel". I.—"The Influence of Alloy Composition upon Compacting and Sintering Behaviour"; II.—"The Properties of Stainless Steel Powders Sintered in Dissociated Ammonia", by R. L. Sands and J. F. Watkinson. (Church House, Great Smith Street, London, S.W.1, 2.30 p.m.)

16 December. Symposium on "Practical Aspects of Pressing Metal Powders" (Church House, Great Smith Street, London, S.W.1., at 9.30 a.m. and 2.0 p.m.). For programme, see p. 112.

Local Sections and Associated Societies

1 December. Liverpool Metallurgical Society. "Low-Temperature Brazing", by H. R. Brooker. (Department of Metallurgy, The University, Liverpool, at 7.0 p.m.)

1 December. London Local Section. "The Origin, Detection, and Elimination of Gases in Cast Metals", by Dr. D. V. Atterton. (Joint Meeting with the London Branch of the Institute of British Foundrymen) (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)

6 December. South Wales Local Section. "'Valence' in Metals and Alloys", by Professor G. V. Raynor. (Metallurgy Department, University College, Singleton Park, Swansea, at 6.30 p.m.)

7 December. Manchester Metallurgical Society. "The Relationship Between Physical Test Results and Engineering Performance", by Dr. J. H. Lamble. (Headquarters of the Manchester Literary and Philosophical Society, George Street, Manchester, at 6.30 p.m.)

8 December. Birmingham Local Section. "Beryllium", by J. Williams. (College of Technology, Gosta Green, Birmingham 4, at 6.30 p.m.)

8 December. East Midlands Metallurgical Society. "The Fabrication of Steam-Generating Equipment for Nuclear Power Stations (with special reference to Welding Problems)", by A. F. Gifford. (Faculty of Applied Science, Clifton Boulevard, The University, Nottingham, at 7.30 p.m.)

8 December. Sheffield Local Section. "Dislocations in Metals", by Dr. P. B. Hirsch. (Applied Science Building, The University, St. George's Square, Sheffield 1, at 7.30 p.m.)

8 December. Southampton Metallurgical Society. "Semi-Conductor Materials", by J. G. Wilkes. (Southampton University, at 7.15 p.m.)

12 December. Scottish Local Section. Film night. (Institution of Engineers and Shipbuilders, Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)

20 December. Birmingham Local Section. "M*E*T*A*L*S" by S. S. Smith. Christmas Lecture for schoolchildren. (Birmingham and Midland Institute, Paradise Street, Birmingham, at 2.30 p.m.)

APPOINTMENTS VACANT

PRESSED STEEL COMPANY LIMITED
STRATTON ST. MARGARET
SWINDON

METALLURGIST

As a result of continued expansion a vacancy has arisen for a Metallurgist in our modern equipped Works Laboratory. The successful candidate must have a good degree in Metallurgy and up to two years industrial experience. However, a person recently qualified would be considered.

The duties include assisting with general metallurgical work as required by the production processes in the Plant.

The Works Laboratory provides a technical service to the Factory which includes investigation of problems and quality of raw material, with particular emphasis on deep drawing sheet steel and cast iron and steel used in die manufacture.

Conditions of employment accord with best modern practice.

Applications will be treated in strictest confidence, and should include details of educational attainments, training, and experience, should be addressed to Personnel Manager.

THE UNIVERSITY OF SHEFFIELD

Post-doctoral Research Fellowships in Metallurgy

Graduates with research experience in metallurgy, solid-state physics, or physical chemistry who desire an opportunity to do metallurgical research on a subject of their choice are invited to apply for the following Senior Research Fellowships tenable in the Department of Metallurgy:

THE J. H. ANDREW RESEARCH FELLOWSHIP
THE C. H. DESCH RESEARCH FELLOWSHIP
THE UNITED STEEL COMPANIES RESEARCH FELLOWSHIP

These Fellowships have been made possible by the generosity of industry.

Fellows will have a wide choice of research topic, though it is hoped that one of them will take a special interest in the application of modern physical techniques to metallurgical problems.

The starting salary will normally be £1,000 per annum, but a higher salary may be paid to a successful candidate with outstanding qualifications and experience. Normal tenure will be five years, but the appointment will be for two years in the first instance and thereafter will be renewable annually. There will be annual increments of £50 per annum and provision will be made for superannuation under the F.S.S.U.

Applications (3 copies), including the names and addresses of referees, should reach the Registrar (from whom further particulars can be obtained) not later than 30 November 1960.

MINISTRY OF AVIATION requires TECHNICIAN at Harefield, Middx., in laboratory for creep and stress testing, high-temperature tensile testing, heat-treatment, and calibration of pyrometric equipt. *Quals.:* Recognized eng. apprenticeship or equiv. training. ONC., C. & G. Final Certs. or equiv. Experience in creep testing and control of heat-treatment furnaces. General knowledge of metallurgy and mechanical testing. *Salary:* £975–£1,115. Application forms from Manager (PE.3154), Ministry of Labour, Professional & Executive Register, Atlantic House, Farringdon Street, London, E.C.4.

PHYSICAL METALLURGIST or X-ray Crystallographer required by Industrial Research Centre at outskirts of Birmingham for progressive, interesting post in crystallography department, concerned with phase-constitutional (and associated) work, largely related to high-temperature materials. The investigations are of both a fundamental and an applied nature. There is much scope for initiative and good work, which will be recognized. Applicant should have B.Sc. (or higher) degree in physics, metallurgy, or chemistry. An attractive salary is offered, commensurate with qualifications and experience. Pension scheme. Applications to Box No. 458, The Institute of Metals, 17 Belgrave Square, London, S.W.1, stating age, experience, and qualifications.

CENTRAL ELECTRICITY GENERATING BOARD
NORTH EASTERN AND YORKSHIRE REGION

Physicists and Metallurgists

Vacancies exist in the Research and Development Department of the North Eastern and Yorkshire Region of the C.E.G.B. for Physicists and Metallurgists/Physicists.

The Department is concerned with research into the problems arising from the operation of conventional power stations.

POST "A"

Physicist required in the Physics Section to carry out applied research covering a wide field. At present the principal projects are heat transfer under dropwise condensation, insulator breakdown due to industrial pollution, and novel methods of measuring gas flow. Applicants should have a good Honours Degree in Physics and at least two years' postgraduate research experience.

POST "B"

Metallurgist/Physicist required in the Metallurgical Section. The work to be undertaken will be of a varied nature; present studies include the measurement of stresses in pressure vessels, the stress-corrosion properties of low-alloy steels, and the performance of brazing materials at elevated temperatures. Applicants should have a good Honours Degree or equivalent in Metallurgy or Physics with at least three years' research experience in the metallurgical field.

POST "C"

Metallurgist required for a position similar to Post "B", except that experience, although advantageous, is not essential.

The salary scale for appointments "A" and "B" will be within the range £1,105–£1,720 per annum, and for Post "C" the initial salary scale will be within the range £780–£1,165 per annum. The commencing salary will depend on qualifications and experience.

The posts will be situated in Leeds and offer excellent promotion prospects within the expanding research organization of the C.E.G.B. Publication of work is encouraged.

Forms of application may be obtained from the Assistant Regional Secretary (Personnel), Central Electricity Generating Board, North Eastern and Yorkshire Region, 1 Whitehall Road, Leeds 1, to whom they should be returned to arrive not later than 30 November, 1960.